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BIOLOGICAL EVALUATION
Western Spruce Budworm

National Forest, National
Park, Indian, State, and Private Lands
Region 3

Insect and Disease Control
State and Private Forestry
Southwestern Region, USDA, Forest Service
517 Gold Avenue, SW
Albuquerque, New Mexico 87102

1974

Prepared by:

ROBERT E. ACCIAVATTI, Entomologist
Insect and Disease Control

ANTHONY H. SMITH, Entomologist
New Mexico Department of Agriculture

APPROVED BY:

Donald P Graham

DONALD P. GRAHAM, Director
Insect and Disease Control

Thomas G. Schmeckpeper

THOMAS G. SCHMECKPEPER
Deputy Regional Forester
State and Private Forestry

INTRODUCTION

Western spruce budworm populations have been at low levels during the last 5 years in Region 3. In 1974, however, budworm populations caused noticeable defoliation throughout much of the Region. Surveys conducted during August 1974 revealed light to moderate defoliation in the Taos, Eagle Nest, Kaibab, and Sandia Units. Budworm populations in these units are expected to produce only light defoliation in 1975, however.

GENERAL INFORMATION

Insect.--Western spruce budworm, Choristoneura occidentalis Freeman

Hosts.--Douglas-fir, Pseudotsuga menziesii (Mirb.) Franco
White fir, Abies concolor (Gord. & Glend.) Lindl.
Subalpine fir, Abies lasiocarpa (Hook.) Nutt.
Blue spruce, Picea pungens Engelm.
Engelmann spruce, Picea engelmannii Parry

Location.--The following sample areas within the respective entomological unit were inspected in 1974:

Chama Unit (Western Division of Carson NF and private lands west of Carson NF)

Lagunitas, San Antonio, Hopewell, Brazos Box, and Red Hill

Cloudcroft Unit (Central Division of Lincoln NF)

Upper Sacramento, Lower Sacramento, Moore Canyon, Nelson Canyon, Benson Ridge, and Alamo

Eagle Nest Unit (State and private lands east of Carson NF, including Philmont Scout Ranch)

South Urraca I, South Urraca II, Ute Park, Sawmill Canyon, Wildlife I, Wildlife II, and Palisades

Kaibab Unit (North Rim of Grand Canyon NP and Northern Division of Kaibab NF)

Murrays Lake, East Lake, Log Road, Tortrix, Saddle Mountain, Dry Park-Big Saddle Road, and North Rim

Navajo Indian Reservation Unit

Roof Butte, Roof Butte Burn, Washington Pass, Tsaile Canyon, and Sanostee

Ruidoso Unit (Mescalero Apache Indian Reservation and Northern Division of Lincoln NF)

Little Creek, Eagle Creek, Pass Summit, Mescalero, and Firman Canyon

Sandia Unit (Sandia Mountains, Cibola NF)

Las Huertas, Capulin Springs, Nine Mile, Dry Camp, Sulphur Canyon, and Cole Springs

Sandia Fe East Unit (Eastern Division of Santa Fe NF)

Gallinas Canyon, Canovas Canyon, Winsor, Black Canyon, and Aspen Vista

Santa Fe West Unit (Western Division of Santa Fe NF)

Clara Peak, Bandelier, Del Norte Pass, Fenton Fork, and Ice Pond

Taos Unit (Eastern Division of Carson NF)

Lower Rio Hondo, Middle Rio Hondo, Upper Rio Hondo, Goose Creek, Cabresto Creek, Bonita Canyon, San Cristobal, Pioneer Creek, Palo Flechada Pass, Upper Capulin, Lower Capulin, Garcia Park, Rio Chiquito, Osha, Picuris, Truchas, Taos Pueblo I, Taos Pueblo II, and Taos Pueblo III

Type of Damage.--Western spruce budworm larvae are responsible for damaging host trees. Young larvae feed in expanding buds and flowers, while mature larvae feed on needles. Shoots are webbed together by the larvae during feeding. By July, the webbed shoots become reddish brown and eventually fall off. Severe defoliation for 4 or 5 years causes trees to die, usually beginning at the top.

Extent of Damage.--Budworm damage was not detected during aerial surveillance, probably because it was too light and scattered to be picked up from the air.

Therefore, acreages of budworm defoliation have not been presented.

METHODS

Region 3 was divided into entomological units based on geographical location of mixed conifer forests and past history of budworm infestations (Fig. 1). Each unit was subdivided into sampling areas. For each sample area, the new growth of at least five Douglas-fir trees was examined during August 1974 to determine defoliation. If defoliation was observed, the sampling procedure developed by McKnight et al.[1/] was used to evaluate the infestation.

The foliage from all branches were examined for egg masses. Predicted 1975 defoliation classes were determined from the density of new egg masses per 1,000 square inches of foliage (Table 1).

The infestation trend for each unit was computed by comparing this year's defoliation class with that for the coming year.

RESULTS AND DISCUSSION

Current defoliation of Douglas-fir, predicted defoliation for 1975, and infestation trends are shown for each unit in Table 2.

The western spruce budworm populations and subsequent defoliation increased in Region 3 during 1974. Defoliation was moderate on the Taos and Kaibab Units and light on the Eagle Nest and Sandia Units. Defoliation was undetectable on the other units.

Budworm activity should not increase markedly in any of the units next year. Only light defoliation is expected on the Taos, Kaibab, and Eagle Nest Units.

No control is recommended at this time.

1/ McKnight, M. E., J. F. Chansler, D. B. Cahill, and H. W. Flake, Jr. 1970. Sequential plan for western budworm egg mass surveys in the central and southern Rocky Mountains. USDA Forest Serv. Res. Note RM-174. 8 p.

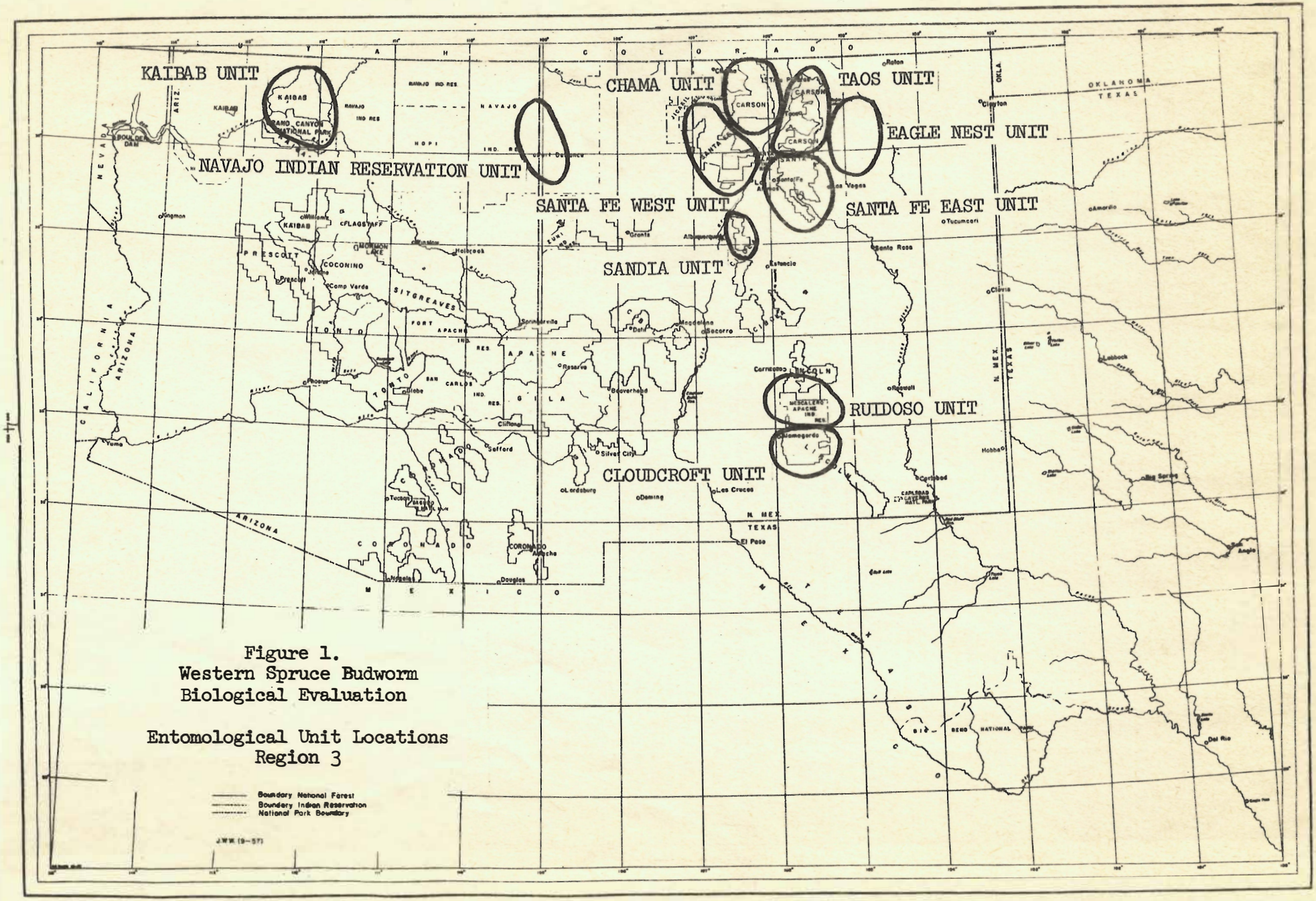

Figure 1.
Western Spruce Budworm
Biological Evaluation

Entomological Unit Locations
Region 3

Table 1.--Class limits for the sequential sampling plan for western spruce budworm egg mass surveys (McKnight et al., 1970)

Class	New egg masses per 24"-branch	New egg masses per 1,000 sq. in.	Defoliation prediction[1/]
1	0.250 or fewer	1.0 or fewer	Undetectable
2	0.275 to 1.0	1.1 to 4.0	Undetectable in static infestation; light in increasing infestation.
3	1.5 to 5.0	6.0 to 20.0	Light in static infestation; moderate in increasing infestation.
4	5.5 or more	22.0 or more	Moderate or heavy

1/ Undetectable - 0 to 5% defoliation of current foliage.
Light - 5 to 35% defoliation of current foliage.
Moderate - 35 to 65% defoliation of current foliage.
Heavy - More than 65% defoliation of current foliage.

Table 2.--Summary of western spruce budworm survey of Douglas-fir, Region 3, 1974.

Entomological unit	Total acres	No. of branch samples	1974 defoliation		No. of new egg masses	1975 predictions		Infestation trend
			%	Class		Infestation class	Defoliation class	
Chama	150,000	No detectable defoliation				--	--	Static
Cloudcroft	150,000	No detectable defoliation				--	--	Static
Eagle Nest	31,000	50	15	Light	21	2	Light	Static
Kaibab	100,000	72	44	Moderate	68	2	Light	Static
Navajo Indian Reservation	103,000	No detectable defoliation				--	--	Static
Ruidoso	300,000	No detectable defoliation				--	--	Static
Sandia	10,500	50	13	Light	10	1	Undetectable	Static
Santa Fe East	300,000	No detectable defoliation				--	--	Static
Santa Fe West	200,000	No detectable defoliation				--	--	Static
Taos	150,000	50	58	Moderate	23	2	Light	Static